

## THE CRESCENT AND THE RED CELL

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## PLATES X-XIII

The following observations were made on a series of thin blood films from a case of malaria in the Federated Malay States. The films were made from 6.8.23 to 14.8.23, during which period the patient was taking quinine grains 20 daily.

Lawson (1911-1920) in a series of papers on the morphology of the malaria parasite, has published a number of beautiful photographs of crescents showing the variable relationship existing between the crescent and the red cell; nevertheless, authors continue to publish illustrations representing practically only one stereotyped form.

In the present paper accordingly we have thought it worth while to draw attention to this variability.

We had also hoped to throw light on the vexed question as to whether the malaria parasite, in so far as the crescent is concerned, is in or on the red cell.

We may state at once that we consider that the specimens show clearly that in many cases the poles of the crescent project beyond the red cell, but we have been unable to determine the relationship of the body of the crescent to the red cell, although the general impression left on our minds after examining a very large number of crescents during the last three months is that the body also is extracellular.

Although we are unable to explain how the 'loop-form' which is probably the commonest form, and which is the one almost

invariably shown in the text books, arises, yet we can trace a transition from the stage in which the red cell stains uniformly, having no portion decolorised, to the loop-form in which the red cell is entirely decolorised except for a skeleton outline or rim.

Lawson has already figured most if not all of the forms we propose to describe, but we think that a diagrammatic representation gives a clearer idea of the appearances actually seen, than does a photograph however beautifully executed.

It will be seen that the majority of the crescents figured are females. This is due to the fact that we frequently experienced difficulty in distinguishing the line of demarcation between the male crescent and the red cell as both stained an almost equally intense red.

This intense red staining of crescent-infected erythrocytes is peculiar and further they do not show any appearance resembling the stippling (Stephens' and Christophers' dots) characteristic of the ring forms of *Plasmodium falciparum*.

With regard to the crescent itself, it appears to us to be a flat ribbon-shaped structure, the ends of which, in thick portions of a film are generally incurved, while in thin portions the crescent lies flat.

We did not observe any forms that we could interpret as young or developmental forms.

The illustrations were made diagrammatically at a magnification of about 4,000 diameters. They may be arranged in four groups.

#### PLATE X (figs. 1-12)

*Group A. Those in which the red cell stains uniformly, presenting a solid appearance.*

Figs. 1, 2, 8, 9. The surface of the crescents appears to show buds or projections.

Fig. 6. Shows a projection at one pole. From its staining character it appeared to be red cell, but in many cases it was impossible to be certain as to the nature of these 'buds.'

Figs. 7-11. The poles of the crescent project beyond the red cell.

Fig. 12. Shows folding of the crescent.

## PLATE XI (figs. 13-24)

*Group B. Those in which the red cell is partly decolorised.*

Figs. 13-18. More or less of the red cell is decolorised.

Figs. 19-24. A gradual transformation to the loop-form.

Fig. 23. Shows a solid wedge of non-decolorised red cell extending across the decolorised area.

Fig. 24. A somewhat similar appearance.

## PLATE XII (figs. 25-36)

*Group C. Those in which the greater part of the red cell is decolorised and in which part of the circumference of the red cell takes the form of a loop usually corrugated and generally subtending the concavity of the crescent.*

Fig. 25. A typical loop-form. The crescent is completely surrounded by a rim of red cell, and the loop arises from two triangular thickenings on one side of it. These thickenings are situated not at the poles of the crescent but at some little distance therefrom. The rim of red cell presents coarse corrugations usually most prominent on its convexity, while the loop presents a series of finer corrugations. The loop bounds an area almost decolorised, but a granular basis can be frequently recognised.

Fig. 26. The crescent has pointed ends and projects beyond the red cell margin.

Fig. 27. A double-loop, a not uncommon form. The poles of the crescent are free.

Fig. 28. A similar form. One pole projects.

Figs. 29, 30. Two loops, both on the same side of the crescent. A possible interpretation is that the crescent lies between the folded red cell.

Figs. 31-35. Irregular loop formation.

Fig. 32. The outline of the red cell can be seen crossing the body of the crescent.

Fig. 36. Unusual position of the loop.

## PLATE XIII (figs. 37-48)

*Group D. Miscellaneous forms.*

Figs. 37-45. The crescents are folded.

Figs. 37-39. The red cell is not decolorised.

Figs. 40-45. Various degrees of folding of the crescents and decolorisation of the red cell.

Fig. 46. A crescent with pointed poles (cp. fig. 26). These forms were encountered not infrequently. Their significance is unknown.

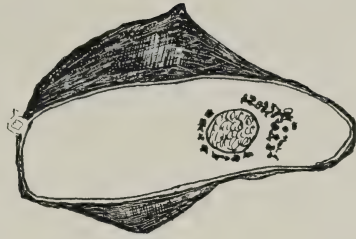
Figs. 47, 48. Double infection of the red cell. In both cases a male and a female crescent occurred in each red cell.

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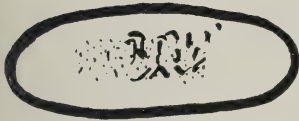
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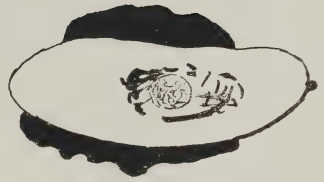
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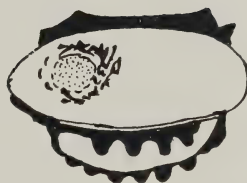
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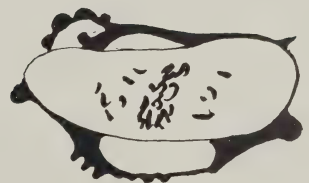
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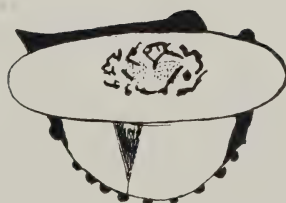
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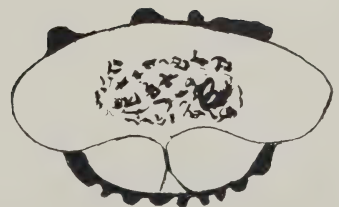
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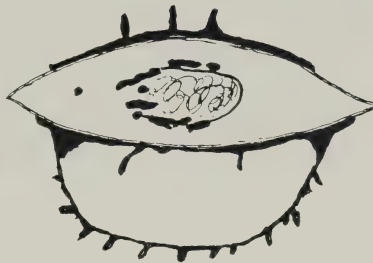
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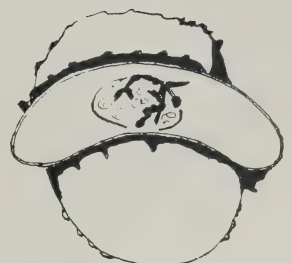
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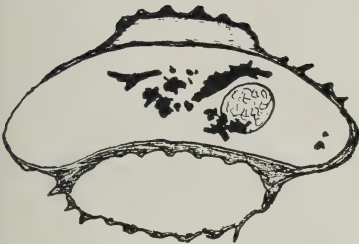
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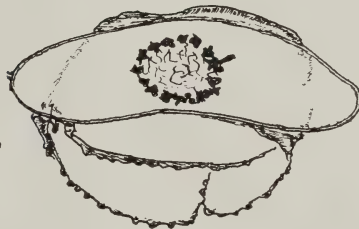
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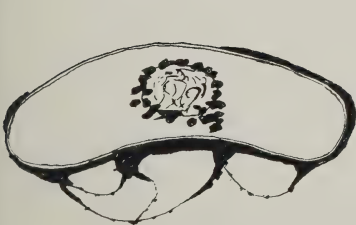
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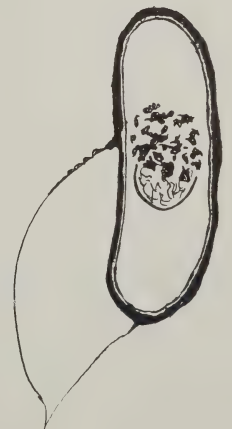
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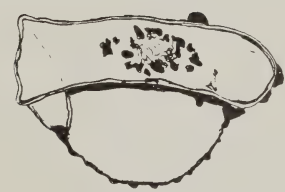
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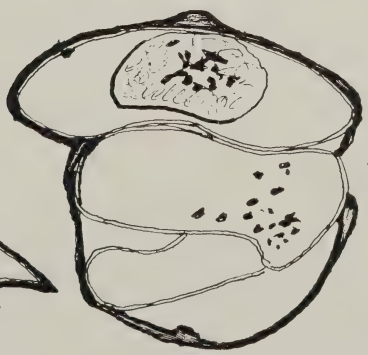
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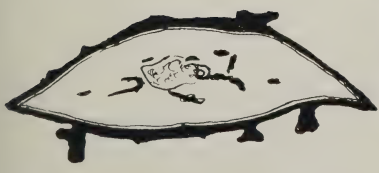
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